

Gathering Data from the Wellsite using WITSML

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Gathering Data from the Wellsite.....?



Wellsite Information Transfer Specification (WITS)

- WITS in use continuously for over 20 years
- The goal of the Workgroup set up: “To define the format and information content of the data stream transmitted from a wellsite to a central site....”
- 25 Records defined, covering drilling, geology, directional data, MWD, cementing, testing
- 4 'Levels' of increasing complexity were created
 - Level 0 = basic ASCII transfer format
 - Level 1 = binary LIS format
 - Level 2 = bi-directional LIS format
 - Level 4 = DLIS format, according to API RP 66
- 25 Records defined, covering drilling, geology, directional data, MWD, cementing, testing
- Only Level '0' is in use....

WITS Pre-Defined Record Types

Rec	Name	Description
1	General Time-Based	Drilling data gathered at regular time intervals
2	Drilling - Depth Based	Drilling data gathered at regular depth intervals
3	Drilling - Connections	Data gathered at drilling connections
4	Hydraulics	Hydraulics data gathered while circulating
5	Trip - Time	Tripping data gathered while running in/pulling out
6	Trip - Connections	Tripping data gathered at tripping connections
7	Survey/Directional	Directional/Survey data
8	MWD Formation Evaluation	MWD Formation Evaluation data
9	MWD Mechanical	MWD Mechanical data
10	Pressure Evaluation	Pressure Evaluation data
11	Mud Tank Volumes	Mud Tank (Pit) Volume data
12	Chromatograph Cycle-Based	Chromatograph Cycle data
13	Chromatograph Depth-Based	Chromatograph data averaged over depth intervals
14	Lagged Mud Properties	Mud Property data based returns depth increments
15	Cuttings / Lithology	Cuttings Lithology and related data
16	Hydrocarbon Show	Hydrocarbon Show related data
17	Cementing	Well Cementing operations data
18	Drill Stem Testing	Well Testing operations data
19	Configuration	Drillstring and Rig Configuration data
20	Mud Report	Mud Report data
21	Bit Report	Bit Report data
22	Comments	Freeform Comments

RECORD # 2 : DRILLING DEPTH-BASED

WITS Record ID 2	Logical Record Type 152	Auto/Manual AUTOMATIC
Trigger [DEPTH] Transmit at a specified depth interval (feet or meters)		
Data Source Data acquired in real-time when on-bottom drilling NEW hole and computed over the trigger interval		

Item	Description	Long Mnemonic	Short Mnemonic	Type	Length	Metric Units	FPS Units
1	<u>Well Identifier</u>	WELLID	WID	A	16	----	----
2	<u>Sidetrack/Hole Sect No.</u>	STKNUM	SKNO	S	2	----	----
3	<u>Record Identifier</u>	RECID	RID	S	2	----	----
4	<u>Sequence Identifier</u>	SEQID	SQID	L	4	----	----
5	<u>Date</u>	DATE	DATE	L	4	----	----
6	<u>Time</u>	TIME	TIME	L	4	----	----
7	<u>Activity Code</u>	ACTCOD	ACTC	S	2	----	----
8	<u>Depth Hole (meas)</u>	DEPTMEAS	DMEA	F	4	M	F
9	<u>Depth Hole (vert)</u>	DEPTVERT	DVER	F	4	M	F
10	<u>Rate of Penetration (avg)</u>	ROPA	ROPA	F	4	M/HR	F/HR
11	<u>Weight-on-Bit (surf,avg)</u>	WOBA	WOBA	F	4	KDN	KLB
12	<u>Hookload (avg)</u>	HKLA	HKLA	F	4	KDN	KLB
13	<u>Standpipe Pressure (avg)</u>	SPPA	SPPA	F	4	KPA	PSI
14	<u>Rotary Torque (surf,avg)</u>	TORQA	TQA	F	4	KNM	KFLB
15	<u>Rotary Speed (surf,avg)</u>	RPMA	RPMA	S	2	RPM	RPM
16	<u>Bit Revolutions (cum)</u>	BTREVC	BRVC	L	4	----	----
17	<u>Mud Density In (avg)</u>	MDIA	MDIA	F	4	KGM3	PPG

&&
 0208408
 9
 021054.4
 0215185
 !!

 &&
 0208409
 0
 021053.7
 0215189
 !!

The WITS problems are still the same

- Each Service company sets up the Record Definitions differently
- The Definitions often change during the Well
- Channels are wrongly assigned, and often impossible to identify
- Units of Measure are incorrect or missing or change during the well
- No mechanism to updating past data – for example removal of spikes or patching of missing data
- The Wellsite crews have limited or no knowledge of managing WITS Data
- Proprietary extensions make systems incompatible

So what is WITSML ? Does it help ?

- Wellsite Information Transfer Standard Markup Language
- Managed by Energistics – www.energistics.org - 100+ Members
- WITSML = WITS + XML
- WITSML is Web Based and built on XML Technology
- XML is Platform and Language Independent
- WITSML is self-describing and self-contained.....

WITSML Data Stream

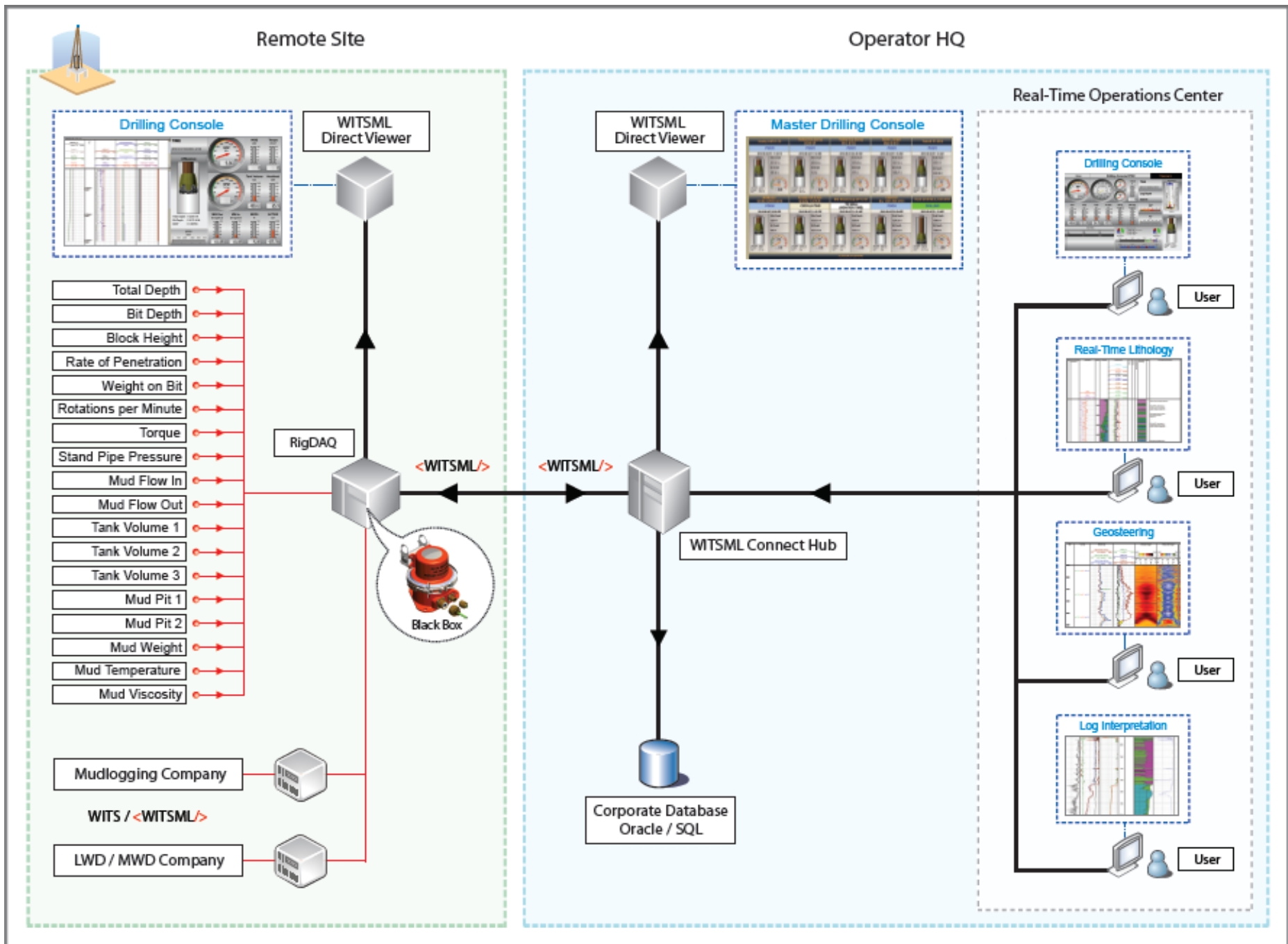
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<nameWellbore>DemoWellbore</nameWellbore>	&&
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<endIndex>4090</endIndex>	021054.4
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<curveDescription>Measured depth</curveDescription>	
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</logCurveInfo>	
<logCurveInfo uid="ROP">	&&
<mnemonic>ROP</mnemonic>	0208409
<unit>ft/h</unit>	0
<columnIndex>2</columnIndex>	021053.7
<curveDescription>Rate of Penetration</curveDescription>	0215189
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<logCurveInfo uid="RPMA">	
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<unit>rpm</unit>	
<columnIndex>3</columnIndex>	
<curveDescription>Rotary Speed</curveDescription>	
<typeLogData>double</typeLogData>	
</logCurveInfo>	
<logData>	
<data>4089,54.4,185</data>	
<data>4090,53.7,189</data>	
</logData>	
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WITSML is the answer then.....but

- Legacy Data Acquisition Systems (DAQ) require upgrading - \$\$\$
- WITSML implies Network Connections – Security Issues
- WITSML 1.0...1.2...1.3.....1.4.....Contractors lagging behind Schema releases...
- So.....Contractors almost all still use WITS , or their own internal proprietary transfer systems.....(99%).....
- Increasing requirement for Aggregating Multiple Vendor Data Streams
- WITSML Data Problems more complex to troubleshoot
- Wellsite Contractor teams not trained in WITSML Support, cannot support the easier WITS standard; field experience levels actually in decline

Wellsite Data Acquisition and Aggregation

- Analog Sensor Data
- Digital Data in WITS / WITSML / Binary Format
- Conversion of all Data to WITSML for synchronisation with Office Stores
- RS 232 Serial Ports or Network TCP/IP Connectors
- Internal Firewall and 'DMZ' Capability
- Data Visualisation on the Wellsite, instead of remotely from Contractor Data centre – reduces satellite bandwidth requirement and rig can continue with operations (e.g Geosteering)
- Remote access by Specialist Support teams with WITSML knowledge
- Storage to Wellsite 'Black Box' Recorder for Incident Evaluation



Wellsite DAQ and Aggregator



Original Flight Black Box Recorder



Wellsite Black Box Recorder



